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## ADVANCING SPACE ENVIRONMENTAL SAFETY

### IS CORPORATE SOCIAL RESPONSIBILITY APPLICABLE?

#### **Abstract**

This paper discusses hard law and soft law provisions within the legal context of space environmental protection. In a scenario where the private sector is rapidly growing, this study asks whether the corporate social responsibility could be a valuable soft law instrument in order to address the challenges derived by the increase exploration of outer space; the new space era is causing environmental hazards in space as well as pollution, and degradation.

Current space laws are not sufficient to address the complex issue of space debris and protect the space environment. The main treaty of the *corpus iuris spatialis*, the so-called Outer Space Treaty contains the keystone principle applicable in outer space; Article III - states that outer space activities must be conducted in accordance with international law- creates a pathway to apply the international environmental law regarding space activities. Furthermore, Article IX is important in the legal debate due to the interpretation of 'harmful contamination' and the due regard principle. Even if some Articles of the Outer Space Treaty can be read in accordance with the environmental protection, however, is not precise enough, the hard law has legal vacuums that need to be filled with tailored measures for outer space.

Soft law mechanisms to minimise the hazards of space debris, on orbit collisions, and to maintain its long-term sustainability have only lately been recommended by the international community as a result of the growth of space actors, especially commercial operators. The adoption of the 2019 Guidelines on the long-term sustainability of activities in outer space at Committee on the Peaceful Uses of Outer Space (COPUOS) can be seen as an understanding of the need to improve the legal protection of the space environment in order to achieve sustainability in space for the benefit of all humankind.

More specifically, this research looks at deepen our understanding of the applicability of corporate social responsibility (CSR) model in outer space for ensuring environmental safety within a sustainable strategy for outer space. Modern companies are not completely unfamiliar to 'do-no-harm' perspective. The resort to the political economy of CSR for space sustainability could be a valid innovative and complementary tool for addressing space environmental safety. Nowadays there are no binding instruments in the space law that require corporations to not harm the environment; it will be more likely to achieve these goals through soft law instruments.

The reduction and removal of space debris are now the subject of continuing discussion in international fora, although the international community has not yet established a course for future measures relating to environmental security in space.

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This study suggests applying the CSR paradigm to the setting of business and space law while considering the issues of the interaction between hard and soft law. It is expected to develop tools that maximise the industry's ability to adapt to the needs of effectively protecting the space environment.

**JEL CLASSIFICATION:** K33

### SUMMARY

1 Introduction - 2 The main environmental threats to outer space - 3 A new role for States in outer space? - 3.1 The legal vacuums of binding instruments from a contemporary perspective - 3.2 International Guidelines - 3.3 Private initiatives - 4 States, orbital environment and space-related business activities - 4.1 Is corporate social responsibility applicable to outer space environment? - 5 Conclusion

## 1 Introduction

The space sector is now booming; in the next 10 years we will witness the establishment of a permanent human presence on the moon thanks to the Artemis mission, the development of outer space tourism and, moreover the increased use of space for Earth economy.

The Space economy<sup>1</sup> is, in fact, growing at a fast rate, but the legal framework is now lacking behind; current hard law provision cannot be considered adequate for the space environmental protection. This paper addresses hard law and soft law provisions within the legal context of space environment's protection focusing on environmental challenges that corporations' activities are likely to bring in outer space and whether a soft law contribution, such as the CSR, could be used for a sustainable strategy.

According to us the increasing importance of these legal challenges are linked to the growing number of space players acting in an environment that is considered a finite resource,<sup>2</sup> there are more and more States with independent orbital launch capability and a growing number of private entities are developing privately funded space launch

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<sup>1</sup> Simonetta Di Pippo, *Space Economy La Nuova frontiera dello sviluppo* (Bocconi University Press 2022) 72. Di Pippo refers to this new economy directed mainly to services as the new space economy; a space sector in which the private and public actors invest together; G Dezi, F Laurenti and J Emeterio, *La nuova corsa allo spazio: dalla guerra tra Stati alla guerra tra miliardari, chi sono i protagonisti della conquista dell'ultima frontiera. Tra scienza e big tech, un viaggio interattivo verso i territori inesplorati* (Rai News, July 2022) <<https://www.rainews.it/speciali/corsaallospazio>> accessed 10 March 2023. The space economy is developing so quickly thanks to the recovery and reuse of part of the vehicle, the current cost of a launch with SpaceX's Falcon Heavy is 30 times lower than that of an old Space Shuttle and 13 times lower than the average cost of the past. Also, the technology required for large satellite constellations has quickly become more reliable and compact.

<sup>2</sup> Antonello Folco Biagini, Mariano Bizzarri *Spazio. Scenari di collaborazione note di diritto internazionale*' (Passigli, 2013) 7; Peter Martinez, 'Development of an International Compendium of Guidelines for the Long Term Sustainability of Outer Space Activities' (2018) 43 *Space Policy* 13; Claudia Cinelli, *La disciplina degli spazi internazionali e le sfide poste dal progresso tecnico-scientifico* (Giappichelli Editore, 2020) 110; Simonetta Di Pippo (n1) 129.

systems<sup>3</sup>. On one hand this development can expand the benefits and the access to space technology while on the other it creates complex challenges linked to the operators' interactions with one another and with the policy and regulatory frameworks.

Furthermore, a huge threat directly linked to the massive space's utilisation is the environmental hazard, such as pollution and degradation raising concerns about the long-term sustainability of outer space as well as deterioration of life on Earth.<sup>4</sup> Such pollution, degradation and orbital congestion are linked to the increase in the number of commercial satellites launched to near-Earth space, with the vast majority being smaller satellites.<sup>5</sup>

Moreover, the number of space objects deployed per launch has shown a significant increase in recent years, with launches of one or two dozen objects at a time now fairly common; 2021 saw a record number of rockets carrying multiple satellites into orbit at the same time.<sup>6</sup> This reduces the launch cost per satellite, but often makes it more difficult to spot and track individual objects.

However, even if a single State, or even a group of States, could adopt measures to mitigate the risks of Earth's orbital congestion and outer space degradation they would not be efficient; in order to effectively do so no unilateral actions should be put in place but multilateral.<sup>7</sup> Pursuant to Articles I and II of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (OST),<sup>8</sup> outer space constitutes an area beyond the national jurisdiction; it belongs to the so called 'global commons'<sup>9</sup> and its legal status is characterised as 'province of all mankind',<sup>10</sup> which cannot be 'subject to national

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<sup>3</sup> Simonetta Di Pippo (n1) 71. Di Pippo refers to this new development of the space sector as the new space in order to differentiate it from the old space - the space activities fully developed under the state's control and fundings.

<sup>4</sup> ESA Space Debris Office, 'ESA'S annual space environment report' (2022) <[https://www.sdo.esoc.esa.int/environment\\_report/Space\\_Environment\\_Report\\_latest.pdf](https://www.sdo.esoc.esa.int/environment_report/Space_Environment_Report_latest.pdf)> accessed 31 March 2023.

<sup>5</sup> ESA Space Debris Office, 'More satellites share a ride into space' <[https://www.esa.int/ESA\\_Multimedia/Images/2022/04/More\\_satellites\\_share\\_a\\_ride\\_into\\_space](https://www.esa.int/ESA_Multimedia/Images/2022/04/More_satellites_share_a_ride_into_space)> accessed on 11 March 2023; UN, 'Our Common Agenda' - Report of the Secretary-General' (NY 2021) 61 <[https://www.un.org/en/content/common-agenda-report/assets/pdf/Common\\_Agenda\\_Report\\_English.pdf](https://www.un.org/en/content/common-agenda-report/assets/pdf/Common_Agenda_Report_English.pdf)> accessed 21 March 2023.

<sup>6</sup> ESA Space Debris Office (n 5).

<sup>7</sup> Gennady Danilenko, 'Outer space and the multilateral treaty-making process' (1989) 4 High Technology Law Journal 217.

<sup>8</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (1967) No. 8843 adopted by the General Assembly in its resolution 2222 (XXI), opened for signature on 27 January 1967, entered into force on 10 October 1967.

<sup>9</sup> UN (n 5) 61. A global common refers to those resource domains that do not fall within the jurisdiction of any one country, and to which all nations have access. According to the Secretary General traditionally outer space is considered a global common out of the jurisdiction of any State.

<sup>10</sup> OST (n 8), Art I paras 1-2. However, there is not a legal definition of global common neither some mechanism to ensure the interest of mankind. Firstly, in 2021 the UN General-Secretary drafted the report Our Common Agenda, where at the paragraph 61 recognised as natural or cultural resources that are shared by and benefit us all. They



appropriation'.<sup>11</sup> This is, in fact, for its own nature a multilateral issue that requires a multilateral solution.

## 2 The main environmental threats to outer space

The space exploration has contaminated both space and Earth's environment since its beginning with the Space race in 1957.<sup>12</sup> Moreover the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) stated that 'space technology was found to represent a factor of damage to the circumterrestrial, terrestrial and planetary environments'.<sup>13</sup>

There are various sources of pollution in space, from the use of products for the combustion of rockets, spacecraft propellants to radioactive contamination that could arise from nuclear powered objects as well as electro-magnetic interference.<sup>14</sup>

Moreover, two other important type of environmental hazards have to be considered; the backward and forward contamination; the latter one being the protection of celestial bodies from terrestrial matters; the former concerns protection of the Earth's biosphere from the contamination by extraterrestrial life forms in the course of spaceflight missions.<sup>15</sup>

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include the four conventionally understood commons that are beyond national jurisdiction - the high seas, the atmosphere, Antarctica and outer space - all of which are now in crisis. This is not a legal definition but is a starting point for the developed of new legal mechanism.

<sup>11</sup> OST (n 8), Art II.

<sup>12</sup> Lotta Viikari, *The Environmental Element in Space Law; Assessing the Present and Charting the Future* (Martinus Nijhoff Publishers Brill Academic 2008) 29. The author analyses medical studies showing the increase in endocrine diseases and blood disorders in children living close to the space base in Baikonur in Kazakhstan; Peter Stubbe, *State Accountability for Space Debris; A legal Study of Responsibility for polluting the Space Environment and liability for Damage caused by Space Debris (Study in Space Law, 12)* (Martinus Nijhoff Publishers Brill Academic, 2017) 13; Alexander Salter, 'Space Debris; a Law and Economics analysis of the Orbital Commons' (2016) 9 *Stanford Technology Law Review* 224.

<sup>13</sup> Alain Poupidou 'The Ethics of space policy' (UNESCO 2000) <<https://unesdoc.unesco.org/ark:/48223/pf0000120681>> accessed 6 June 2023.

<sup>14</sup> Steven Aftergood and others, 'Nuclear Power in Space' (1991) 264 (6) *Scientific American* 42; Peter Stubbe (n12) 13.

<sup>15</sup> Thomas Cheney and others 'Planetary Protection in the New Space Era: Science and Governance', (2020) 7 *Front. Astron. Space Sci, Sec. Astrobiology* para 2; COSPAR, 'Panel on Planetary Protection (PPP)' approved on 3 June 2021 <<https://cosparhq.cnes.fr/scientific-structure/panels/panel-on-planetary-protection-ppp/#scope>> accessed 23 March 2023; Furthermore the Committee of Space Research (COSPAR), to protect the space environment from harmful contamination which would threaten the scientific exploration of outer space, developed the Planetary Protection Policy (PPP). COSPAR was created after the beginning of the space race by the International Council for Science now International Science Council. The ISC has global membership of 230 organisations aiming at advancing human development within sustainable planetary and social boundaries. The objectives is to provide technical standards that, in order to safeguard and facilitate ongoing and future scientific explorations, limit the biological and molecular contamination of exploration activities in solar system's bodies and protect the Earth's biosphere by avoiding harmful biological contamination carried back by spacecraft. The COSPAR's PPP defines specific technical guideline to ensure the environmental protection of outer space: for example, for some missions' planetary protection sets limits for the

However, the main source of pollution is space debris. As noted in the Report of the Secretary-General on reducing space threats through norms, rules and principles of responsible behaviours many States consider space debris ‘the most significant threat to the space environment’.<sup>16</sup> Moreover, a contribution to that risk is the lack of effective communication between space systems and the presence of non-functional space objects. It is also observed that the risk could have a disproportionate impact on States with new space programmes.<sup>17</sup>

Even if the international community is addressing the matter, there is not a hard law provision giving a legal definition of space debris; regarding this matter the UN in the Space Debris Mitigation Guidelines defines debris as a ‘manmade objects including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non-functional’.<sup>18</sup> There are other definitions of space debris given from private and public actors related to the non-functionality and valueless of the space object.<sup>19</sup>

The consequences of the old space exploration and economy are blocking, through piles of never-ending space junk the future uses of outer space;<sup>20</sup> scientific studies talk about the Kessler syndrome to show the ever growing cycle of generating debris from

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level of acceptable microbiological contamination and for the probability of a spacecraft crashing on specific target bodies. The idea was that the PPP became embedded as the international standard by which contamination of celestial bodies would be avoided. Both the European Space Agency (ESA) and the National Aeronautics and Space Administration (NASA) developed their own Planetary Protection Policies.

<sup>16</sup>UN GA, Report of the Secretary-General on reducing space threats through norms, rules and principles of responsible behaviours UN Doc A/76/77 (2021) para 12.

<sup>17</sup> *ibid* para 10.

<sup>18</sup> UN GA RES 62/217, Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space (22 December 2007). Scholars have been analysing the matter, among the others: Lotta Viikari (n12) defines Space Debris as a general term referring to all tangible man-made materials in space other than functional space objects, the author points out the presence of natural space debris created by meteoroids; George Hackett *Space Debris and the corpus iuris spatialis* (Editions Frontières, Gif-sur-Yvette 1994) according to the author the term debris describes a man-made object that lost operational control, including inactive payloads, operational debris, fragmentation debris and micro particulate matter; Peter Stubbe (n 12) 14, citing the Inter-Agency Space Debris Coordination Committee describes debris as a manmade object ,including fragments and element thereof, in earth orbit or reentering atmosphere, that are nonfunctional; Matteo Madi, Olga Sokolova *Space Debris Peril Pathways to Opportunities* (CRC Press 2020) - the authors address the issue of States’ jurisdiction over the debris recognising the registry’s State jurisdiction over it and so its approval for removing or moving the debris.

<sup>19</sup> See Lotta Viikari (n12) 33 for a specific analysis on the legal implications of defying a satellite valuable or valueless by the State that registered the object; Christos Kypraios, Elena Carpanelli, ‘Space Debris’, [2018] Max Planck Encyclopedia of Public International Law - the authors analyse the fact that all definitions of space debris are contained in soft law instruments, which do not create any legally binding obligations for States. The absence of a legal definition of space debris introduces ambiguity and calls into question the relevance of existing instruments in regulating of space debris; the draft of the ‘European Code of Conduct for Space Debris Mitigation’ available at <<https://www.unoosa.org/documents/pdf/spacelaw/sd/2004-B5-10.pdf>> accessed 17 July 2023 that defines space debris as “[a]ny man-made space object including fragments and elements thereof, in Earth orbit or re-entering the Earth’s atmosphere, that is non-functional”, and space object as “[a]ny man-made space system and any of its components or fragments” (pp. 13-14).

<sup>20</sup> Chandana Rohitha Rajapaksa and Jagath Wijerathna, ‘Adaptation to Space Debris Mitigation Guidelines and Space Law’ (2017) 15 (1) *Astropolitics The International Journal of Space Policy and Politics* 65, 76.



the collision of manmade objects that could lead to the inoperability of orbits;<sup>21</sup> especially the Geostationary Orbit (GEO) and the Low Earth Orbit (LEO) would be, according to these studies the most affected by debris, posing threats to our life on Earth since those regions are the main interests for the economic development of space.<sup>22</sup>

It is estimated that there are currently about 5465 operational satellites in the Earth orbit.<sup>23</sup> These satellites are operating in an orbital environment that is becoming increasingly congested; there is in fact more space debris than operational satellites- especially due to the fragmentation of existing objects. More than 30 000 pieces of space debris have been recorded and are regularly tracked by space surveillance networks.<sup>24</sup>

The two main events that created debris were the Chinese anti-satellite test conducted in 2007 that led to the destruction of the 1-C satellite and the creation of 150000 pieces of debris<sup>25</sup> and the collision between the Cosmos 2251 - a USSR inactive satellite - and the operating at that time Iridium 33, a USA satellite with the creation of 2000 pieces of debris measuring at least 10 centimetres in diameter.<sup>26</sup>

Furthermore, the debris does not only pose a threat to the space environment itself but also to the Earth due to the harm created by the re-entry of space objects.<sup>27</sup> These

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<sup>21</sup> Donald J Kessler and Burton G Cour-Palais, 'Collision Frequency of Artificial Satellites: The Creation of a Debris Belt', (1978) 83 (A6) *Journal of Geophysical Research: Space Physics* 2637, 2646; Matteo Madi, Olga Sokolova (n 18) 74; Alexander Salter (n 12) 34, identifies the beginning of creation of debris in 1961 with the explosion a space vehicle. There are three main States responsible for debris; China is responsible approximately for 42%, Russia - for 25% and United States of America - for 27%.

<sup>22</sup> Lotta Viikari (n 12) 41, furthermore the GEO has an important role for the telecommunication and weather satellites. Not the entire GEO is important for human activities on the Earth since three-quarters of the Earth surface are covered by water. This means that only few parts of GEO are useful to human activities and so there are parts of the orbit more congested than others. The main threat is the possibility to developing countries to access these particular areas of GEO and the possible frequency interferences.

<sup>23</sup> See data of Statista Research Department of the University of Pisa, Number of satellites in orbit by major country as of April 30, 2022 (2022) <<https://www.statista.com/statistics/264472/number-of-satellites-in-orbit-by-operating-country/>> accessed 13 March 2023. The Country with biggest amount of satellites is United State with 3,433, followed by China: 541 and Russia: 172. The other States have a combined number of satellites of 1,319.

<sup>24</sup> ESA Space Debris Office (n 4) 19.

<sup>25</sup> Alexander Salter (n 12) 34; for a specific analysis about the consequences of the collision see Carmen Pardini and Luciano Anselmo, 'Assessment of the consequences of the Fengyun-1C breakup in low Earth orbit' (7th COSPAR Scientific Assembly, Montréal, Canada, 13-20 July 2008).

<sup>26</sup> Brian Weeden, '2009 Iridium-Cosmos Collision Fact Sheet' (Washington, DC: Secure World Foundation, November 10, 2010) available at: <[https://swfound.org/media/6575/swf\\_iridium\\_cosmos\\_collision\\_fact\\_sheet\\_updated\\_2012.pdf](https://swfound.org/media/6575/swf_iridium_cosmos_collision_fact_sheet_updated_2012.pdf)> accessed 17 July 2023; Alexander Salter (n 12) 34.

<sup>27</sup> Alexander Salter (n 12) 75.

threats became concrete in the case of Cosmos 954, a USSR nuclear-powered satellite that crashed in Canada in 1978.<sup>28</sup>

As aforementioned space activities can create economic threats to human life on the Earth per se - such as health problems - and to the space industry. However, we should start to take into account the consequences of human activities to the outer space environment as forward contamination can destroy the outer space environment in an unchangeable way.<sup>29</sup> Due to this consideration, it is necessary to ensure that the current and future use of outer space by public and private actors is sustainable and takes into account the rights of the future generations.

The accumulation of debris shows that the legal framework for the preservation of the environment needs to be filled with specific environmental measure. An important way to address the issue of debris is through the Space Situational Awareness (SSA) since satellite's operator and crewed spacecraft need information about space object's position. There is not a unique legal definition of SSA.<sup>30</sup>

However, we could say that the SSA is known as the 'process of obtaining timely, accurate and transparent awareness of space operating environment'.<sup>31</sup> SSA plays a crucial role in ensuring the safety, security and sustainability of space exploration. It requires a network of globally distributed sensors as well as data sharing between satellite's owners.<sup>32</sup> The USA operates the largest network of sensor and so the most complete catalogue of space objects.<sup>33</sup> The second largest system is operated by Russia and consists of phased array radars and optical telescopes, most of them located in the former Soviet Republics. Furthermore, several European countries operate in the sector

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<sup>28</sup> Alexander F Cohen 'Cosmos 954: The International Law of Sattelite Accidents', in W Michael Reisman and Andrew R Willard (eds) *International Incidents* (Princeton University Press 1988) 68, 84 - for a more broad description of the accident and the Canadian and USSR views on it.

<sup>29</sup> Lotta Viikari, (n 12) 52; eg, the Moon does not have substantial atmosphere and so every minor change of the surface created by human activities has to be consider permanent.

<sup>30</sup> Matteo Madi, Olga Sokolova (n 18) 14 (table) the authors analyse the different definition of SSA; European Space Agency, "SSA Programme Overview", <[https://www.esa.int/Safety\\_Security/SSA\\_Programme\\_overview](https://www.esa.int/Safety_Security/SSA_Programme_overview)> accessed 9 June 2023 defines SSA as 'the comprehensive knowledge, understanding, and maintained awareness of: the population of space objects, the space environment, and the existing threats and risk's; EU Satellite Centre 'Space Situational Assessment (SSA)' <<https://www.satcen.europa.eu/page/ssa>> accessed 9 June 2023. The EU Satellite Centre defines it as 'knowledge of the space environment, including location and function of space objects and space weather phenomena. SSA is generally understood as covering three main areas: Space Surveillance and Tracking (SST) of man-made objects; Space Weather (SWE) monitoring and forecast; Near-Earth Objects (NEO) monitoring only natural space objects.

<sup>31</sup> Matteo Madi, Olga Sokolova (n 18) 12.

<sup>32</sup> Brian Weeden, 'Space Situational Awareness Fact Sheet', (Washington, DC: Secure World Foundation, May 2017) available at: <[https://swfound.org/media/205874/swf\\_ssa\\_fact\\_sheet.pdf](https://swfound.org/media/205874/swf_ssa_fact_sheet.pdf)> accessed 10 June 2023. The ground base radar was historically the main source for SSA but also optical telescope as well as other sensor such as the ones decking radio frequency.

<sup>33</sup> *ibid*- the USA system is also known as the Space surveillance network (SSN) and it is managed by the military.



and in 2008 ESA started the SSA Preparatory Program to create a European SSA based on national data.<sup>34</sup>

### 3 A new role for States in outer space?

According to the United Nations Office for Outer Space Affairs (UNOOSA) space law is the body of law governing space-related activities. The term is most often associated with rules, principles and standards of international law appearing in the five international treaties developed under the United Nations that form the so-called *corpus iuris spatialis*.<sup>35</sup> In addition to these international instruments, many States have national legislation governing space-related activities due to the increase in the sector's privatisation.<sup>36</sup>

There are no binding instruments that directly guarantee the environmental protection in the use and exploration of outer space. The OST, in fact, does not have any specific provision that can be strictly considered for this purpose. Instead, soft law instruments have been developed regarding the mitigation of space debris and the long-term sustainability of outer space. Soft law provisions -more than hard law- seem to better encourage private actors to have an eco-friendly approach; however, it does not immediately translate to meaningful management but could lead to greenwashing.<sup>37</sup> There are several different reasons behind a company's decision to carry out greenwashing practices, the major one being the economic advantages. We have already seen the greenwashing practice in environmental initiatives on Earth.<sup>38</sup> In order to avoid

<sup>34</sup> Ibid.

<sup>35</sup> The five treaties that create the *corpus iuris spatialis* are: Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies; The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space; The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies; The Convention on International Liability for Damage Caused by Space Objects; The Convention on Registration of Objects Launched into Outer Space.

<sup>36</sup> United Nations Office for Outer Space Affairs, 'National Space Law' <<https://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html>> accessed 23 March 2023.

<sup>37</sup> Regulation of the European Parliament and of the Council (EU) 2020/852 of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 OJ L198, 22.6.2020, p 13-43 in para 11 defines greenwashing as 'the practice of gaining an unfair competitive advantage by marketing a financial product as environmentally friendly, when in fact basic environmental standards have not been met'; for more information see Magali Delmas Vanessa, Cuerel Burbano 'The Drivers of Greenwashing' (2011) 54 (1) California Management review 64, 82 <[https://www0.gsb.columbia.edu/mygsb/faculty/research/pubfiles/14016/cmr5401\\_04\\_printversion\\_delmasburbano.pdf](https://www0.gsb.columbia.edu/mygsb/faculty/research/pubfiles/14016/cmr5401_04_printversion_delmasburbano.pdf)> accessed 24 March 2023.

<sup>38</sup> Agostino Vollero, *Greenwashing: Foundations and Emerging Research on Corporate Sustainability and Deceptive Communication* (Emerald Publishing Limited 2022) 65, 93. The author analyses the Volkswagen case. George Kassinis and Alexia Panayiotou 'Visuality as Greenwashing: The Case of BP and Deepwater Horizon' (2017) 31 (1) Organization & Environment 25, 47, it analyses the different ways in which companies can change their behaviour in order to continue with the greenwash practice, depending on the type of control of the stakeholders. The authors also focus on the importance of the visual aspect of greenwash and analyse the Deepwater Horizon case; Sharon Beder *Global spin:*



the greenwash practice it is important that States oversee private initiatives; this type of control could come, at the national level, from the CSR<sup>39</sup> and at the international one from the principle of due diligence; States should oblige themselves under international law to respect and protect the outer space environment; through the CSR tool States could create modules and codes of conduct in their national law, to ensure that their companies carry out sustainable activities and projects.

This chapter will analyse the binding instrument developed by the international community, particularly the OST, and both private and public guidelines created in recent years to tackle the space debris and long-term sustainability problems.

### 3.1 The legal vacuums of binding instruments from a contemporary perspective

The necessity of outer space law to regulate outer space activities commenced with the launch of Sputnik and developed within the UN;<sup>40</sup> in particular the COPUOS and the UN General Assembly had the merit of establishing the foundation stones that are still valuable today.<sup>41</sup> Proof of this is the adoption within the UN of five treaties and principles; the basic one being the Outer Space Treaty that entered into force on October 1967, and to which most of the international community is a part.<sup>42</sup> We also have to remember that the outer space law born in the UN is complemented by many bilateral and multilateral agreements concluded outside the international organisation.<sup>43</sup>

Even if written in a different historical context the OST contains the keystone principles applicable in space such as the freedom of exploration and the non-appropriation.<sup>44</sup> However, the *corpus iuris spatialis* does not include specific provisions for the preservation and protection of the extra-atmospheric environment. However, even if there are no clear norms that could be directly link to the protection of the

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*The corporate assault on environmentalism* (Green Books Ltd; 2nd edition 2002) case of General Electric case in USA is analysed.

<sup>39</sup> Mike Wright and others (eds) *The Oxford Handbook of State Capitalism and the Firm*, (Oxford University Press 2022) part VI.

<sup>40</sup> Space exploration served as another arena for Cold War competition between the USA and the USSR. The beginning of the space race was on October 4, 1957, when a Soviet R-7 intercontinental ballistic missile launched the world's first artificial satellite - Sputnik. As a consequence NASA was created by the President of the United States Eisenhower. In 1961, the Soviet space programme took another step forward when the Soviet cosmonaut Yuri Gagarin became the first person to orbit earth. The possibility to start using the outer space for military purposes led the international community to create the OST.

<sup>41</sup> Peter Martinez (n 2) 14.

<sup>42</sup> UN GA RES 222/XXI (19 December 1966) 'Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies' <[https://treaties.unoda.org/t/outer\\_space](https://treaties.unoda.org/t/outer_space)> accessed on 16 March 2023. The Number of States Parties is 113.

<sup>43</sup> UN Office for Outer Space Affairs 'Bilateral and Multilateral Agreements Governing Space Activities' <<https://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/bi-multi-lateral-agreements.html>> accessed 17 March 2023.

<sup>44</sup> Peter Martinez (n 2) 14.



outer space environment, there are three Articles of the OST that are now considered the closest norms to regulating space environment. The first one is Article I that recognises outer space and its resources as a common good, under the principle of ‘common interest of mankind in outer space’.<sup>45</sup> The Article at the first paragraph while using the term ‘province of all mankind’, reinforced the protection of the interests of both space and non-space nations; this principle implies that the exploration and use of outer space must be beneficial to humankind as a whole.<sup>46</sup>

The second one is Article III of the OST that states that space activities shall be carried in accordance with international law including the Charter of the United Nations. Article III is in fact defined as a gateway through which rules of the international regime can apply in outer space.<sup>47</sup> This implies that other branches of international law, such as international environmental law can be applied to all space activities contributing to the protection of the space environment.<sup>48</sup>

Furthermore, we should ask ourselves to which extent environmental law is applicable to outer space and if outer space can be considered environment.

Firstly, we have to understand what environment means. International law does not provide any definition; however, we can define it as ‘[t]he relationship of human beings with water, air, land and all biological forms,’ or as ‘the combination of elements whose complex interrelationships make up the settings, the surroundings and the conditions of life of the individual and of society, as they are and as they are felt’.<sup>49</sup>

Nowadays the human’s activities and space are deeply linked; we greatly benefit from space technology especially in the field of telecommunication, Earth observation and also exploration. In this sense we could consider space as part of the environment and so applying part of the international environmental law.<sup>50</sup>

Among the international environmental law, the no harm principle is applicable,<sup>51</sup> namely the responsibility of States to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States, or of areas beyond the limits of national jurisdiction. The customary no harm rule, while being applicable to

<sup>45</sup> Art I OST.

<sup>46</sup> Claudia Cinelli (n 2) 128.

<sup>47</sup> Pierfrancesco Breccia, ‘Article III of Outer Space Treaty and its relevance in the international space legal framework’ (IAC-16, E7,1,2,x33555, 67th International Astronautical Congress, 2016) para. 2.3.

<sup>48</sup> Lotta Viikari (n 12) 120.

<sup>49</sup> Daniel Bodansky *The Art and Craft of International Environmental Law* (Harvard University Press 2009) 10. First international environmental law focuses primarily on the interactions of humans and the natural world. It presupposes a separation between humans and nature. Some changes are natural and beyond the purview of international environmental law while others are caused by humans and are thus susceptible to regulation.

<sup>50</sup> Biswanath Gupta and Tamoghna Agasti, ‘The Curious Case of Article IX and Outer Space Environment’ (2022) 2 (2) *Journal of Environmental Impact and Management Policy* 7, 25.

<sup>51</sup> Initially applicable only for Neighbouring States, now it can be applied to outer space. For a more specific analysis see Peter Stubbe, ‘Common but Differentiated Responsibilities for Space Debris - New Impetus for a Legal Appraisal of Outer Space Pollution’ (2010) 31 *European Space Policy Institute Perspectives*.

areas beyond national jurisdiction, is reflected in the environmental protection in regard to the *res communis* concept.<sup>52</sup>

Furthermore, the Third UN Conference on the Exploration and Peaceful uses of Outer Space, adopted in 1996 ‘The Space Millennium: Vienna Declaration on Space and Human Development’ a non-binding declaration stating the need to protect the space environment and the applicability of the sustainable development to outer space.<sup>53</sup>

Finally, Article IX introduces the principles of cooperation, mutual assistance and due regard in the exploration and use of outer space. The principle of due regard is satisfied when States exercise their own rights without resulting in an unjustifiable interference with other States. The due regard can be considered both a self-restraint principle and a duty of care; in fact, it does not imply that any harm is a breach of international law. The country fulfils its duty of care if it implements all the expected measures - in consideration of the international responsibilities- to prevent the damages.<sup>54</sup> However, Article IX does not specify what can be considered a lawful behaviour making the enforcement nearly impossible.<sup>55</sup> From an environmental law point of view is possible to apply the principle of due regard in order to encourage States to have responsible behaviours;<sup>56</sup> if, in addition State practice is accumulated with the help of detailed guidelines and implementing national regulatory frameworks, the due regard would be effectively applied to space activities.

Article IX also puts other obligations on States; while studying or exploring the outer space or any celestial body, States should ‘avoid harmful contamination and also adverse changes in the environment of Earth resulting from the introduction of extraterrestrial matter’. It is necessary to understand what entails harmful contamination and whether it includes protection of the outer space environment; from a first analysis the objective of Article IX is to underpin the international cooperation in carrying out space activities while protecting the celestial body from harmful contamination.

However, in absence of any specific norms we should apply the Vienna Convention on the Law of Treaties (VCLT) to evaluate the possibility of the OST to ensure the protection of outer space. According to the VCLT there are two main interpretational criteria to evaluate the applicability of the OST; the teleological and textual one.<sup>57</sup>

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<sup>52</sup> *ibid* para 4.1; Lotta Viikari (n 12) 148 the *res communis* principle is gaining more relevance with regard to the protection of the space environment highlighting an intrinsic value of outer space.

<sup>53</sup> UN, Report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19-30 July 1999 , A/CONF.184/6.

<sup>54</sup> Lotta Viikari (n 12).

<sup>55</sup> Gordon Chung, ‘Emergence of Environmental Protection Clauses in Outer Space Treaty: A Lesson from the Rio Principles’ in Annette Froehlich (ed) *A Fresh View on the Outer Space Treaty* (Springer Cham 2018) 1, 13; John S Goehring, ‘Can We Address Orbital Debris with the International Law We Already Have? An Examination of Treaty Interpretation and the Due Regard Principle’ (2020)85 (2) *Journal of Air Law and Commerce* 309, 337.

<sup>56</sup> Peter Stubbe (n 12) para 4.2; Biswanath Gupta and Tamoghna Agasti (n 50) para 3.

<sup>57</sup> Claudia Cinelli (n 2) 120.



In relation to the textual approach, it is possible to analyse the current meaning of harmful contamination and space object; it seems possible to define space debris as a space object that has an impact on the orbital environment that could lead to a harmful contamination.<sup>58</sup> Regarding the teleological principle, a rational interpretation of the OST's purpose is to ensure benefits for all States in exploring and exploiting outer space. Hence, the benefit cannot be guaranteed if the environment is not protected due to the risks of overexploitation.<sup>59</sup>

Furthermore, it seems also appropriate to apply an evolutionary approach in order to enlarge more broadly the meaning of harmful contamination with reference to the concepts of sustainable development<sup>60</sup> only if there are not any contrary provisions and if the purpose and objective of the treaty are respected;<sup>61</sup> in this case the meaning of harmful contamination could cover the introduction of space debris and other new sources of contamination.<sup>62</sup>

However, certain debris is inherent to space exploration and so not all actives can be considered as harmful contamination; any debris generation has to be considered as a source of pollution but depending on the magnitude of the pollution itself a single generation of debris can be considered as harmful contamination and so be prohibited under Article IX.<sup>63</sup>

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<sup>58</sup> *ibid* 121.

<sup>59</sup> *Ibid*.

<sup>60</sup> Ma Xinmin, 'The Development of Space Law: Framework, Objectives and Orientations' (United Nations/China/APSCO, Workshop on Space Law, 2014) 12; Space law's regulation, protection, and direction have been crucial to the development of outer space technologies and activities throughout history. The development of the space law needs to proceed in the same direction as the advancement of space activities and technologies. Therefore, in order to make greater contributions for the benefit of humanity as a whole, the development of the space law needs to keep up with the times; Report of the Secretary-General, 'Our Common Agenda' (n 11) 61, According to the Secretary General the main Governance arrangements for outer space, were established in a State centred era and provide only general guidance and principle on how to manage outer space and its resources. Also, due to the technological development there's the need to update the regulatory regimes in order to protect and preserve outer space; Claudia Cinelli (n 2) 121 the evolutionary approach gives the possibility to interpret the treaties depending on the historical period in which the analysis is made.

<sup>61</sup> Claudia Cinelli (n 2) 121.

<sup>62</sup> Krzysztof Niewęglowski, 'Space debris and obligations erga omnes - a legal framework for states' responsibility?' (8<sup>th</sup> European Conference on Space Debris, Darmstadt, 2021) para 4; Stephan Hobe and others(eds) *Cologne Commentary on Space Law, Volume I Outer Space Treaty* (Carl Heymanns Verlag Cologne 2009) 177; Peter Stubbe (n 12) according to the author the creation of debris must be regarded as a man-made alteration of the outer space environment, and so the production of debris constitutes a form of pollution. Furthermore it can be considered contamination due to the transformation of the space object in orbit into an undesirable element only years after its initial transfer. Furthermore it is not only the launch of the object into space a source of contamination but also the possible generation of debris in situ. The contamination needs also to be classified as 'harmful' in order to fall within the scope of Art. IX; nowadays the level of debris in orbit threatens the interests of State in the exploration and use of outer space, falling again within the scope of Art. IX.

<sup>63</sup> Peter Stubbe (n 12) 166, Whether the threshold of harmfulness is crossed must be assessed against the background of the individual case, as for example the destruction of the Chinese 1C satellite generated a huge increase in the debris population and so has to be considered as harmful contamination.

Nevertheless, Article IX is specific in its application when it comes to the Earth's atmosphere; the treaty puts a legal duty on States in order to address the contamination of outer space from scientific exploration. In this case Article IX states that 'States Parties to the Treaty shall conduct exploration to avoid adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose'.<sup>64</sup> In fact, in order to consider an activity a potential change in the atmosphere of Earth the change has to be 'adverse' and caused by 'introduction of extraterrestrial matter'.<sup>65</sup> Any other changes to the Earth's atmosphere due to other reasons would not be covered by Article IX. Due to this consideration, it can be said that this provision does not serve as a tool to ensure environmental purposes.

Article IX also states the duty to consult in case any States parties have reasons to believe that an activity can cause potential harmful interference; two conditions have to be fulfilled; firstly, the activity should 'potentially cause harmful interference with activities of other States parties'.<sup>66</sup> Secondly the State must have 'reason to believe'<sup>67</sup> that the activity or experiment would cause potential harmful interference. However, the Article itself does not specify what activities should be considered as harmful interference neither prescribes the procedure for appropriate international consultations nor designates an agency to which States should turn for the evaluation of the proposed uses or experiments in outer space.<sup>68</sup> Thus, the international consultations merely depend on the subjective analysis of the particular State carrying out the space activity.

To conclude, as shown above Article IX lacks precision making in it difficult to apply and considered breached, therefore it has never been used.

We should briefly focus the attention on the Liability Convention<sup>69</sup> and Registration Convention<sup>70</sup> since neither of these two instruments can be applied to the environmental protection. The former one was elaborated on Article VII of the OST that establishes the liability of States for their activities in space but, also, for those space objects owned by the government or companies under their jurisdiction. It applies for damages caused by both the successful and failed launch irrespective of whether the space object causes damages on the surface of Earth, to an aircraft in flight or elsewhere. The main purpose of the Convention is to favour transparency and accountability of States in their space activities and ensuring compensation for possible private and property damages.

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<sup>64</sup> Art IX OST.

<sup>65</sup> Ibid.

<sup>66</sup> Ibid.

<sup>67</sup> Ibid.

<sup>68</sup> Biswanath Gupta and Tamoghna Agasti (n 50) para 3.

<sup>69</sup> UNGA RES 2777 (XXVI) 1971, Convention on International Liability for Damage Caused by Space Objects.

<sup>70</sup> UNGA RES 3235 (XXIX) 1974, Convention on Registration of Objects Launched into Outer Space.



Article I gives a definition of damage as ‘loss of life, personal injury or other impairment of health; or loss of or damage to property...’, of a launching State as a ‘State which launches or procures the launching of a space object; a State from whose territory or facility a space object is launched’ irrespective of the principle of national responsibility under Article VI of the OST.<sup>71</sup>

Furthermore, the convention makes a distinction based on the location of the damages; if the damage is caused on earth, the launching State is absolutely liable. This is a very victim-oriented situation, much better than for any other international damage.<sup>72</sup>

However, most of the time the damage is caused in outer space, in this case the Convention is less efficient because it only states for fault liability, based on a negligent or intentional conduct of the State.

Additionally, there are two main vacuums of the space liability regime; the former one is its design; it was not created to provide compensation for environmental damage as such since is concerned with direct damages suffered by States persons.<sup>73</sup> The latter one is that the Convention refers only to States, specifically launching States, but not to private actors. The States are in fact the only subject of international law to which the convention is directed; in recent years with the increasing role of private actors this provision could create concerns to the launching State; however, we also have to notice that the liable State is free to recover any payable damages from private actors using its domestic law.<sup>74</sup>

Moreover, the lack of a precise terminology in the Liability Convention can even be interpreted to exclude all damages caused by space debris since it applies to the damage ‘caused by a space object’.<sup>75</sup> If space debris does not qualify as a space object for the purposes of the Liability Convention, the instrument becomes meaningless in establishing liability for space activities.<sup>76</sup> Regardless of the definition of space object and the inclusion of the debris in the definition itself there are practical difficulties in

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<sup>71</sup> For a more specific analysis on the relation between Article VII of the OST and the Liability Convention Bin Cheng *Studies in International Space Law* (Clarendon Press, 1998) 613.

<sup>72</sup> Armel Kerrest, ‘Space debris, remarks on current legal issues’ (ESA, 3rd European Conference on Space Debris, 2001) para 2.2.

<sup>73</sup> Lotta Viikari (n 12) 66. Only Article XXI can be linked to the environmental consequences of space activities. It mentions damage presenting ‘a large- scale danger to human life’ or seriously interfering ‘with the living conditions of the population or the functioning of vital centres’. This article does not regulate liability but aspires to guarantee ‘appropriate and rapid assistance to the State which has suffered the damage’.

<sup>74</sup> Kirsten Schmalenbach *Corporate Liability for transboundary Environmental Harm; An International and Transnational Prospective* (Springer 2022) chapter 11.

<sup>75</sup> Art. I of the Liability Convention (n 62) space object are defined as: ‘component parts of a space object as well as its launch vehicle and parts thereof’.

<sup>76</sup> Lotta Viikari (n 12) 70. The vague definition of space object creates problems linked to the definition itself of space debris, as for example in the case of little pieces of debris, as one can argue that such items are neither a space object nor a component part of one.

establishing the liability of the launching State due to the impossibility to prove that a particular piece of debris was part of a registered space object.<sup>77</sup>

So far, no liability claim has been processed under the Liability Convention even if several incidents involving space objects have caused tangible and considerable damages; ie the crashed of Cosmos 954 in Canada<sup>78</sup> but the Canadian government settled claims against the USSR outside the framework of the Liability Convention in 1981.<sup>79</sup>

Furthermore, also the registration convention has its relevance for the environment; the Convention obligates, according to Article II and IV, the launching States to register the launched object in a national register and also to give, 'as soon as practicable'<sup>80</sup> the UN Secretary General all the practical information regarding the object. All these information is kept in the UNOOSA register.<sup>81</sup>

One of the main limits of Article II is that it does not specify any requirements, thus establishing the rules and nature of the registry are left to the nations themselves.<sup>82</sup> The States practice differs in many aspects; from the time of submission of the information to the UN to the information given.<sup>83</sup>

The Registration and Liability Convention operate together; in case of collision the information given pursuant of the Registration Convention can be highly important in establishing the liability of the launching State. However, both Conventions have the same problems of interpretation for the launching State, space object and their concrete application.<sup>84</sup>

The problem with the *corpus iuris spatialis* is its general normative structure that is not enough to create a legal framework in accordance with the needs of the new space sector, especially regarding the environmental protection.

Owing to the inadequacy of aforementioned Treaties along with the difficulty of enacting new laws at the international level in the last two decades several initiatives have been launched at the international level, regarding the creation of soft law tools, to face the challenge of space safety, security and sustainability. In order to better understand the situation this article tries to give an analysis of the soft law tools that have been developed by the international community such as the Guidelines on Space Debris Mitigation and the Guidelines for the Long-Term Sustainability (LTS) of Outer Space Activities, as well as guidelines that are being developed by private actors.

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<sup>77</sup> *ibid* 71.

<sup>78</sup> *ibid* para 2.

<sup>79</sup> Kirsten Schmalenbach (n 74) 535.

<sup>80</sup> Registration Convention (n 63), Art. II.

<sup>81</sup> Registration Convention (n 63), Art. III.

<sup>82</sup> Henry Hertzfeld, 'Unsolved issues of compliance with the registration convention' (2021) 8 (3) *Journal of Space Safety Engineering* 240.

<sup>83</sup> Lotta Viikari (n 12) 75. Also, there is not any type of control over the accuracy of the given information.

<sup>84</sup> *ibid* 75.



### 3.2 International Guidelines

Since the earliest days of the Space Age, the UN COPUOS has been the principal intergovernmental forum for broad dialogue on international cooperation in the exploration and peaceful uses of outer space and for the development and codification of laws and principles governing space's activities. There are currently no binding instruments in this field that require institutions or corporations to adopt a specific form of conduct in accordance with the environmentalism principles; therefore, these goals will have to be achieved mainly through soft law instruments and voluntary commitments. States, in fact, can decide to adopt guidelines and best practices regarding some areas of cooperation; neither the guidelines nor the best practices are legally binding, but we can consider them a good example of the attitude of the international community toward a topic. Furthermore, despite their non-binding status under international law, the guidelines can have a legal character in the sense that States may choose to incorporate elements of the guidelines in their national legislation.<sup>85</sup>

The proven inadequacy and lacuna in the primary space law treaties and principles vis-à-vis protection of the outer space environment was first flagged the 1990s in the UN COPUOS Scientific and Technical Subcommittee that only a decade later - in 2007 - led to the adoption of the Space Debris Mitigation Guidelines by the UN General Assembly.<sup>86</sup> This was one of the first times that a legal instrument was drafted, solely dedicated to the outer space environment gaining wide acceptance among the international community. While this was a first big step forward in the protection of the outer space environment, these guidelines cannot be considered sufficient to address all space's environmental issues. The Space Debris Mitigation Guidelines can be divided into different broad categories; prevention of the release of debris during normal operations, post-mission disposal, and collision avoidance.<sup>87</sup> They only address and explain various measures for the mitigation of space debris, focusing only on one aspect of the outer space environment i.e., pollution through space debris.

Even if the Guidelines constituted an important step toward in reducing the risks related to space debris, they are not sufficient in the long-term run; they do not provide a comprehensive approach considering that the environmental protection is not mentioned. Furthermore, these Guidelines are non-legally binding instruments with low

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<sup>85</sup> Laura Byrd, 'Soft Law in Space: A Legal Framework for Extraterrestrial Mining' (2022) 71 (4) Emory Law Journal 832.

<sup>86</sup> UN GA Res. 62/217, 'International Cooperation in the Peaceful Uses of Outer Space', 2008, UN Doc. Res. 62/217; Peter Stubbe n 12) 233. The deliberation was held since 2022 under a multi-year work plan and since 2005 within the scope of a working group. Even if there were adopted by the UN General Assembly the Guidelines were not considered by the Legal Subcommittee a distinct UN General Assembly resolution; for a specific analysis on the history and adaptation of the debris issue of debris Chandana Rohitha Rajapaksa and Jagath K Wijerathna (n 20).

<sup>87</sup> Ibid.



levels of compliance and enforceability; in fact the States are the one to voluntarily implement them.<sup>88</sup> The instrument itself also provides that ‘Member States and international organisations should voluntarily take measures [...] to ensure that these Guidelines are implemented’.<sup>89</sup>

The Inter-Agency Space Debris Coordination Committee (IDAC)<sup>90</sup> developed its own Space Debris Mitigation Guidelines with the objective of describing accepted practices for limiting the space debris. IDAC’s mitigation document was adopted in 2002 and has subsequently been updated;<sup>91</sup> by the time of its first adoption, its Guidelines represented the first international regulatory document of its kind.

The document is more detailed than the UN COPUOS Mitigation Guidelines, containing a number of definitions and several mitigation guidelines; after defining space debris as all man-made objects in Earth orbit that are non-functional it describes the main aspects of the Space Debris Mitigation Plan that should be developed for every program and project- from the assessment risk related to space debris to the plan for disposal.<sup>92</sup>

Also, the Guidelines state that any project or experiment that will release objects on the orbital environment should be planned only if it can be verified that the long-term effect on the orbit is very low.<sup>93</sup>

In developing the UN COPUOS Mitigation Guidelines, the UN COPUOS Scientific and Technical Subcommittee based its considerations on the work of the IDAC.<sup>94</sup>

Finally, the International Organization for Standardization’s (ISO)<sup>95</sup> international standards 24113 shall be considered an additional source of mitigation requirements. Shortly after the publication of the first edition of IADC’s Space Debris Mitigation

<sup>88</sup> ESA, ‘Mitigating space debris generation’, <[https://www.esa.int/Space\\_Safety/Space\\_Debris/Mitigating\\_space\\_debris\\_generation](https://www.esa.int/Space_Safety/Space_Debris/Mitigating_space_debris_generation)> accessed 17 March 2023; Peter Stubbe (n 12) para 3.1.

<sup>89</sup> UN COPUOS Mitigation Guidelines (n 18).

<sup>90</sup> IADC is an international forum of space agencies for the coordination of activities related to the issues of space debris both human-made and natural. Members of the IADC are the Italian Space Agency, Centre National d’Etudes Spatiales, China National Space Administration, Canadian Space Agency, German Aerospace Center, European Space Agency, Indian Space Research Organisation, Japan Aerospace Exploration Agency, Korea Aerospace Research Institute, National Aeronautics and Space Administration, State Space Corporation, State Space Agency of Ukraine, and United Kingdom Space Agency. The IDAC purpose is to facilitate exchange and cooperation in space debris research and develop options for space debris mitigation, See IDAC Terms of Reference, No. 1.

<sup>91</sup> Peter Stubbe (n 12) 235.

<sup>92</sup> Inter-Agency Space Debris Coordination Committee, ‘IADC Space Debris Mitigation Guidelines’ (2020) <<https://orbitaldebris.jsc.nasa.gov/library/iadc-space-debris-guidelines-revision-2.pdf>> accessed 1 April 2023.

<sup>93</sup> Ibid.

<sup>94</sup> Peter Stubbe (n 12) 235; Chandana Rohitha Rajapaksa and Jagath K Wijerathna (n 20) 67.

<sup>95</sup> ISO website <<https://www.iso.org/about-us.html>> accessed 8 June 2023, ISO is an independent, non-governmental international organization with a membership of 168 national standards bodies. It was established over 70 years ago to promote standards for international trade, communications and manufacturing. The development of a standard typically takes place within one of ISO’s Technical Committees and/or Subcommittees. TC20/SC14 is the ISO committee tasked with developing international standards that capture best practices for space systems and operations.



Guidelines in 2002, the ISO set up a Working Group to transform guidelines and best practices from IADC, UN, spacecraft operators and regulatory bodies into a comprehensive set of international standards as a variety of space debris mitigation standards. In 2010, Subcommittees began publishing the first of its debris mitigation standards as the ISO 24113,<sup>96</sup> a ‘top level standard’<sup>97</sup> setting forth the basic measures limiting the generation of space debris and is applicable to all phase of a space mission from the design to the disposal of spacecraft and launchers. The standards are organised in a hierarchical structure; the ISO 24113 are at the top, while below there are several lower-level international standards which describe detailed requirements and implementation measures designed to enable compliance with the high-level requirements.<sup>98</sup> At the lowest level in the hierarchy there are two technical reports which contain non-normative information to guide space system engineers in the standards’ application. Since 2010 more have been issued with changes that reflect the technological advancement of the sector, i.e. the inclusion in the high-level requirements pertaining to collision avoidance or survivability against small debris and meteoroid impacts in the 2019 standards.<sup>99</sup>

An important step towards the suitability of space is the Guidelines for the Long-Term Sustainability of Outer Space Activities, non-binding Guidelines adopted in 2019, after a 10-year process, by the COPUOS.<sup>100</sup> They are a sign of shared awareness of the need to enhance the legal protection of space environment towards the sustainability of space in the interest of all humankind.<sup>101</sup> They are also intended to support States and international organisations in developing their space capabilities in a manner that avoids causing harm to the outer space environment and the safety of space operations.<sup>102</sup>

One of the important parts of the LTS Guidelines that needs to be analysed is the preamble. It states that the voluntary guidelines have the objective to maintain space environment safe and tries to enforce international cooperation in order to allow future generation and developing countries to use outer space without any discrimination and

<sup>96</sup> ISO Technical Committee 20 (Aircraft and space vehicles), Subcommittee (Space systems and operations) 14 ‘Space systems–Space debris mitigation requirements’ 2011. The latest version was published in 2019.

<sup>97</sup> ISO, Store: Standards Catalogue: ISO 24113 <<https://www.iso.org/standard/72383.html>> accessed 8 June 2023.

<sup>98</sup> Hadley Stokes and others, ‘Evolution of ISO’s space debris mitigation standards’ (2020) 7 (3) *The Journal of Space Safety Engineering* 325.

<sup>99</sup> *ibid* 328 for a more specific analysis on the evolution of ISO standards; for a more specific analysis of the ISO 24113 standards see Peter Stubbe (n 12).

<sup>100</sup> UN GA, Guidelines for the Long-term Sustainability of Outer Space Activities UN General Assembly Doc A/AC.105/C.1/L.366 (2019) Annex III; for an specific analysis on the effort of the working group of UN COPUOS to create the 2016 LST guidelines see Peter Martinez (n 2).

<sup>101</sup> Minna Palmroth and others, ‘Toward Sustainable Use of Space: Economic, Technological, and Legal Perspectives’, (2021) 57 *Space Policy* 5.

<sup>102</sup> UN COPUOS, UN COPUOS Guidelines for the Long-Term Sustainability of Outer Space Activities: Early implementation experiences and next steps in COPUOS UN Doc. A/74/20 (71st International Astronautical Congress - The CyberSpace Edition, 2020).

in respect of the principle of due regard. The COPUOS has been, in fact, stressing the importance of international cooperation for the sharing of practices linked to the implementation of the LTS Guidelines.

Moreover, there are four different categories of guidelines; the first one is policy and regulatory: this group of guidelines addresses the need for national regulatory frameworks for space activities since States are internationally responsible for the activities conducted by entities or persons under their jurisdiction. The second one is safety of space operations: these guidelines place a lot of emphasis on coordination and information sharing; this includes addressing the issues linked to the exchange of relevant information on events in near Earth space and the importance of standardised record-keeping on space objects.

The third one is international cooperation and capacity-building; contains several guidelines that address how international cooperation, information sharing, and capacity-building can be used in support of the long-term sustainability of outer space. The fourth one is scientific and technical aspects: contains guidelines that address the importance of carrying out research on the evolution of space debris and how to manage the debris population in the long-term run. The guidelines recognise a wide variety of ways in which States organise, conduct and regulate their space activities. The first point to note about implementation of the LTS Guidelines is that they are voluntary and not legally binding. However, States -that are internationally responsible for the space activities of persons and entities under their jurisdiction- may choose to incorporate elements of the guidelines in their national legislation. However, in order to achieve the maximum implementation these guidelines have to be widely implemented also by non-governmental and private space actors.

Effective guideline implementation will also require greater harmonisation, coordination and cooperation among different States of the international community in order to avoid regulatory *lacunae* when space activities are conducted across multiple jurisdictions. Another objective is that with more States reporting their implementation of the LTS Guidelines, other States will be socially pressured to do likewise and demonstrate that they are willingly protecting space's environment and ensuring sustainability of outer space. This is how international norms can become customary practice of States and so become binding instrument of the international law.

### 3.3 Private initiatives

Regarding the private sector there are currently no binding instruments that require institutions or corporations to adopt a specific form of conduct in accordance with the environmental principles. However, the commercial sector could be an important player in developing technological, financial and operational measures to address the challenges of space sustainability; if outer space stops to be secure and safe - due to the



increasing pollution- the ability to use it could be denied to all actors.<sup>103</sup> In the space sector, in fact, there is a need for public and private cooperation, for two main reasons; the first one is that State budgets can't afford the exploration of space;<sup>104</sup> the second one is the increasing interests in private actors for outer space; Space Tech Analytics published a study showing that there are 12,000 private space technology companies and 5,000 leading investors in the sector.<sup>105</sup>

In October 2019, the Satellite Industry Association (SIA) adopted a set of Principles of Space Safety for the Commercial Satellite Industry.<sup>106</sup> In September 2019, the Space Safety Coalition was established, as a coalition of several dozen companies and organisations that actively promotes responsible space activities through the adoption of international standards, guidelines, and recommended practices. In particular, the members of the organisation commit themselves to implementing the guidelines contained in the coalition's document named Best Practices for the Sustainability of Space Operations.<sup>107</sup> These best practices are generally applicable to all spacecraft, regardless of physical size, orbital regime or constellation size, and directly address many aspects of the LTS Guidelines.<sup>108</sup>

Moreover, there is also another developing research linked to the sustainability of space missions; the Space Sustainability Rating System (SSR).<sup>109</sup> The Space Sustainability Rating design was discussed in the World Economic Forum, and developed by the European Space Agency, the Space Enabled research group at Massachusetts Institute of Technology, the University of Texas at Austin, and BryceTech. The goal of the SSR - by fostering voluntary actions- is to ensure that satellite operators design missions compatible with sustainable standards. The SSR uses a composite indicator based on six different modules that are evaluated independently but these modules can be modified,

<sup>103</sup> Secure Word Foundation, 'Space Sustainability, a particle guide' 2018 <[https://swfound.org/media/206407/swf\\_space\\_sustainability\\_booklet\\_2018\\_web.pdf](https://swfound.org/media/206407/swf_space_sustainability_booklet_2018_web.pdf)> accessed 8 June 2023.

<sup>104</sup> SpaceTech Analytics, 'SpaceTech Industry 2021; year overview' <[https://analytics.dkv.global/spacetech/spacetech\\_industry\\_year\\_2021\\_overview.pdf](https://analytics.dkv.global/spacetech/spacetech_industry_year_2021_overview.pdf)> 10 accessed 23 March 2023. In this research it is also showed the distribution of the SpaceTech industries; 56.4% of them in 2021 were in USA.

<sup>105</sup> Ibid.

<sup>106</sup> Satellite Industry Association, 'Principles of Space Safety for the Commercial Satellite Industry' (2019) <[https://sia.org/space\\_safety/](https://sia.org/space_safety/)> accessed 27 February 2023.

<sup>107</sup> More information about the Space Safety Coalition, as well as the text of the Coalition's Best Practices for the Sustainability of Space Operations <<https://spacesafety.org>> accessed 10 March 2023.

<sup>108</sup> Ibid. The guidelines states that the members of the association should collaborate at the international level in order to promote and apply the LST Guidelines and other international standards - such as the one on space debris - to ensure the long-term sustainability of outer space; they should also ensure transparency favouring information sharing in order to avoid possible conjunctions and other space flight safety hazard. SIA members should also monitor operational spacecraft health and status to guarantee successful disposal.

<sup>109</sup> Space Sustainability Rating System <<https://spacesustainabilityrating.org/the-rating/>> accessed 14 March 2023.

in order to assure a more precise evaluation in different analysis and also due to the technical development.<sup>110</sup>

The lack of clear, widely accepted technical and safety standards for responsible performances would put the long-term sustainability of space activities at risk. Unfortunately, international norms are not precise enough to handle the complex issues of space debris and environmental protection.

#### 4 States, orbital environment and space-related business activities

Since the beginning of international law States were its main subject; its principles and norms were developed in order to regulate relations between States.<sup>111</sup> Nowadays with an increasing importance of private actors at the global level international law has been trying to overcome the legal challenges related to the non-recognition of enterprises as subject of law.<sup>112</sup>

This process has already happened for the Human Rights arena, and it has been discussed for the environmental international law and now, for the orbital one. However, we have to consider that there is not a unique definition of CSR and furthermore, different roles that States can play in its application.<sup>113</sup>

According to the UN Industrial Development Organization (UNIDO), the CSR ensures that all types of companies integrate environmental and social concerns in their interaction with stakeholders, and more broadly with the society as a whole.<sup>114</sup>

Another definition was given by the European Commission, according to which the CSR puts an obligation on businesses to consider how they affect the environment and society; the European Commission also underpinned the importance for companies to

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<sup>110</sup> A rated entity will receive, based on the single score of the modules, a rating level between Bronze, Silver, Gold or Platinum. The six score that are being used are Mission Index, Data Sharing, Collision Avoidance Capability, Design and Operations Standards, External Services and Detectability, Identification and Trackability. More information available at <<https://spacesustainabilityrating.org/the-rating/>> accessed 8 March 2023.

<sup>111</sup> Andrea Gioia *Diritto Internazionale* (Giuffrè 2019) para 1.

<sup>112</sup> Historically companies are not a subject to international law, so, they were not held responsible at the same level as States. However, beginning in the 1980s, the fast development of commercial space enterprises which led to the privatisation of worldwide telecommunications administrations, had prompted the rapid progress of nationwide rules and regulations globally.

<sup>113</sup> Mike Wright and others (n 39) part VI para 1. There are five different types of relations between CSR and States; CSR as a self-government, CSR as facilitated by government, CSR as partnership with government, CSR as mandated by government, CSR as a form of government.

<sup>114</sup> UN Industrial Development Organization, 'What is CSR?' <<https://www.unido.org/our-focus/advancing-economic-competitiveness/competitive-trade-capacities-and-corporate-responsibility/corporate-social-responsibility-market-integration/what-csr>> accessed 17 March 2023.



incorporate social, environmental and human rights principles into their business strategy.<sup>115</sup>

Furthermore, a broader definition was given in the Guidance on social responsibility by the ISO: ‘The essential characteristic of social responsibility is the willingness of an organisation to incorporate social and environmental considerations in its decision making and be accountable for the impacts of its decisions and activities on society and the environment’.<sup>116</sup>

We can say that the CSR strategy has a double objective; not only to meet the consumer’s needs, but also the expectations of other parties such as staff, suppliers and the local community.<sup>117</sup>

In the past the pursuit of company objectives was thought to be sufficient for the company itself to carry out its social role - by producing wealth and creating jobs - and at the same time as a contribution to the development of the economic system in general. Nonetheless, in recent years there has been an awareness of the substantial differences and trade-offs existing between the two functions considering the growing importance of the sustainable development of industries.<sup>118</sup>

There are three main principles at the base of the interdisciplinary concept of CSR;<sup>119</sup> accountability, sustainability and transparency. Sustainability in this cases analyses at what rate resources are consumed in relation to the rate at which they are regenerated.<sup>120</sup> Accountability is a concept that qualifies the effects of action taken by the company; it concludes the reporting of such effects to the stakeholders that have the power to decide whether the company’s actions can be justified.<sup>121</sup> Transparency is

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<sup>115</sup> Commission, ‘Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions’ COM (2011) 681 final of 25 October 2011.

<sup>116</sup> International Standards Organization, ISO 26000 ‘Guidance on social responsibility’ Lignes directrices relatives à la responsabilité sociétale’ (2010) para. 2.18.

<sup>117</sup> UN Industrial Development Organization (n 114). There are different industries’ functions; an economic one, orienting to the pursuit of profit; and social one aiming at minimising the negative impacts of the business in the community in which the company operates UNIDO usually targets one or more levels: Micro: involves direct support to companies belonging to the same sector; Meso: focuses on business support to both public and private institutions to foster the uptake CSR concepts in their sphere of influence; Macro: support government institutions in determining what public policies best support a country’s private sector in its efforts to apply socially and environmentally responsible business practices. The UNIDO also developed the Responsible Entrepreneurs Achievement Programme (REAP) a tool based on the CSR that assist Small and Medium Enterprises in their efforts to implement CSR approaches methods.

<sup>118</sup> Vasja Roblek and others, ‘Corporate social responsibility and challenges for corporate sustainability in first part of the 21st century’ (2020) 10 (19) *Cambio Rivista Sulle Trasformazioni Sociali* 35; Ilias Bantekas, ‘Corporate Social Responsibility in International Law’ (2004) 22 *Boston University International Law Journal* 309.

<sup>119</sup> David Crowther, Güler Aras ‘*Corporate Social Responsibility*’ (Bookboon.com 2008) available at <[https://my.uopeople.edu/pluginfile.php/57436/mod\\_book/chapter/121631/BUS5116.Crowther.Aras.CSR.pdf](https://my.uopeople.edu/pluginfile.php/57436/mod_book/chapter/121631/BUS5116.Crowther.Aras.CSR.pdf)> accessed 16 March 2023.

<sup>120</sup> Ibid.

<sup>121</sup> Ibid.

linked to the aforementioned principles as a part of the process of recognition of responsibility for the company's external effects.<sup>122</sup>

Examples of CSR initiatives would be internal policies such as reducing carbon footprints to mitigate climate change, improving labour policies and embracing fair trade, and making socially and environmentally conscious investments.<sup>123</sup>

We have to distinguish between different categories of CSR; the first one is linked to the protection of the worker's human rights while the second is the Corporate Environment Responsibility (CER) for the atmosphere's protection from pollution. The CER refers to industries' voluntarily actions to decrease their negative impact on the ecosystem and to ensure environmental protection.<sup>124</sup> The inclusion of sustainability in the scope of CSR is important because it integrates consideration of long-term issues whenever a corporation engages in an economic initiative; the idea of sustainable development requires, also, the duty of States to include environmental considerations into their new policies.

The same principle was used by the International Court of Justice (ICJ) in the decision concerning the *Gabcikovo - Nagymaros Project* between Hungary and Slovakia.<sup>125</sup> In its

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<sup>122</sup> Ibid.

<sup>123</sup> Digital Marketing Institute, 16 Brands Doing Corporate Social Responsibility Successfully <<https://digitalmarketinginstitute.com/blog/corporate-16-brands-doing-corporate-social-responsibility-successfully>> accessed 3 March 2023.

<sup>124</sup> Mauricio Andrés Latapí Agudelo, Lára Jóhannsdóttir and Brynhildur Davídsdóttir, 'A literature review of the history and evolution of corporate social responsibility' (2019) 4 International Journal of Corporate Social Responsibility 7: during the 1990's, significant international events influenced the international perspective towards social responsibility and the approach to sustainable development. The most relevant include: the creation of the European Environment Agency (1990), the Rio Declaration on Environment and Development, the adoption of Agenda 21 and the United Nations Framework Convention on Climate Change (1992), and the adoption of the Kyoto Protocol (1997). The Rio Declaration, for examples, says that business has the responsibility to ensure that their activities within do not cause harm to the environment. Society expects business to be good actors in the community and increasingly society is expressing a clear need for more environmentally sustainable practices. The creation of these international bodies and the adoption of international treaties represented the first efforts, by the international community, for setting higher standards with regards to climate issues and, indirectly to corporate behaviour. Also, in the 1990's there was a growing interest in Corporate Social Responsibility, and in fact, it was during this decade that the concept gained international appeal, as the result of the international approach to sustainable development of the time in combination to the globalisation process.

<sup>125</sup> In 1993 the Governments of the Hungary and of the Slovak Republic submitted to the ICJ the issues regarding the implementation and the termination of the Budapest Treaty of 1977 on the Construction and Operation of the Gabčíkovo-Nagymaros Barrage System. The parties requested the Court to decide whether the Republic of Hungary had been entitled to suspend and subsequently abandon the works on the project. The project aimed at the production of hydroelectricity, the improvement of navigation and the protection against flooding. It provided for the building of two series of locks, one in Czechoslovak territory and the other in the Hungarian, to constitute a single operational system of works. As a result of intense criticism against the project in Hungary, the Hungarian Government decided in 1989 to suspend the works and later on the government decided to not continue the work. During this period, Czechoslovakia also started investigating alternative solutions; one of them, entailed a unilateral diversion of the Danube by Czechoslovakia on its territory. On 23 July 1991, the Slovak Government decided to put the operation by the above-mentioned solution.



judgment of 25 September 1997, the Court acknowledged that the concerns expressed by Hungary for its natural environment were linked to an essential interest, but that the risks invoked, were not sufficiently established in 1989, nor had they been imminent. The ICJ also noted that Hungary - when it decided to conclude the Treaty - had been aware of the situation as then known; and that the need to ensure the protection of the environment had not escaped the parties. The Court in its decision stated that States in order to ensure the environmental protection have also to consider the unchangeable damages that their action could create. The ICJ states that '[t]his need to reconcile economic development with protection of the environment is aptly expressed in the concept of sustainable development'.<sup>126</sup>

On the other side it can be considered that the CSR transfer at the industry level the obligation to respect the local communities through the concept of environmental sustainability.<sup>127</sup>

This analysis focuses on the CER and the sustainable development applicability to outer space; seen the recent research development on the subject - especially in the Human Right arena and in the environmental one<sup>128</sup> - it seems plausible to ask ourselves if and how the CSR is applicable to outer space.

Generally, CSR is at the heart of the question of what role a State has in its economy.<sup>129</sup> There are five different types of relations between CSR and States; CSR as a self-government, CSR as facilitated by government, CSR as partnership with government,

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<sup>126</sup> International Court of Justice reports of judgments, advisory opinions and orders case concerning the Gabčíkovo-Nagymaros project judgment of 25 September 1997 <<https://www.icj-cij.org/files/case-related/92/092-19970925-JUD-01-00-EN.pdf>> para 140.

<sup>127</sup> The importance of corporate sustainability has been emphasised with the creation by the United Nations of a global association - the United Nations Global Compact - of companies and NGOs that follow, in their activities, the universal principles contained in the association's framework. These define corporate sustainability as a concept that gives a company long-term value in financial, social, environmental and ethical terms. The ten principles cover the areas of human rights, environment, transparency and anti-corruption. Three of these ten principles regarding the environment; they aim not solely at protecting the environment but also at ensuring that this process increase businesses's efficiency, the development of new eco-friendly technologies, and create a social pressure to other industries to do the same. The first one is the development of a precautionary approach; precaution involves the systematic application of risk assessment, management and communication. Scientific-technological evaluation, economic cost-benefit analysis and political considerations are the factors considered when deciding the tolerable level of risks. The second one tries to promote environmental responsibility; business has to ensure that their operations do not cause harm. The third one encourages the spread of environmental protecting technologies. These technologies can be applied to reduce daily operating inefficiencies, emissions and worker exposure to hazardous materials.

<sup>128</sup> For a more specific analysis on Human Right see Chiara Macchi *Business, Human Rights and the Environment: The Evolving Agenda* (T.M.C. Asser Press The Hague 2022). For a more specific analysis on the outer space environmental protection see Elena Cirkovic, Mino Rathnasabapathy Danielle Wood, 'Promoting Sustainability Value in Earth's Orbit' (73rd International Astronautical Congress, 2022).

<sup>129</sup> Mike Wright and others (n 39) part VI para 1.



CSR as mandated by government, CSR as a form of government.<sup>130</sup> However, there is not a systematically explored legal framework related to the features of the State that are relevant in terms of CSR implementation; each State, based on its own economic and political characteristics will have a different approach and interest for applying CSR standards.<sup>131</sup> For example, the Swiss government see its role, in respect of CSR implementation and development as a complementary one.<sup>132</sup> In its CSR strategy, the State Secretariat for Economic Affairs points out the government's main tasks such as supporting the development of tools for non-financial reporting and other CSR transparency initiatives, promoting the international harmonisation of non-financial

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<sup>130</sup> *ibid*, in the case of CSR as a self-government there is a bottom-up process in which the role of States is minimal, they can create soft-law regulation for governance standards or labels and certification. The CSR as facilitated by government is linked to the possibility of States to encourage adoption of CSR both in a direct and indirect way, through conferences or guidelines. The CSR as partnership with government describes a multi-stakeholder process in the development of CSR standards. The CSR as mandated by government has different forms; it can form companies' self-regulation or partnerships. The last one, CSR as a form of government, refers to three types of situations; in liberal economies States chose a *laissez-faire* approach; CSR can become a form of government or thirdly companies can function as institutional substitutes to governmental entities.

<sup>131</sup> *ibid*. Regarding the applicability of CSR at the State level, there is a huge variation depending on the type of State that we are considering. According to the authors there are different features that shape State's action in economy and so in applying CSR; based on these features we can divide States in four different types: regulatory State, development State, welfare State, predatory State. The regulatory States use indirect means of intervention, and it is highly unlikely they will intervene with direct means; they do have the capacity to intervene but decide not to. Developmental and welfare states are more likely to use direct means; both these States have the capabilities. The predatory State may not directly pursue any specific CSR norms, making them all voluntary and bottom up; usually because they lack capacity such as professional public service. There is also to notice the importance of politics in these scenarios. Regulatory States can be expected to follow neo-liberal ideas that refrain from pursuing public goods but focus on the private one while maximising the welfare. The welfare States as well as the development States are associated with the pursuit of some form of public good the predatory ones pursue private interests and use the States' apparatus only to do so. Based on these differences the authors predict a type of outcome for CSR implementation as well as different stakeholder power and legitimacy. As an example, the authors analyse different situations: the United Kingdom can be considered a regulatory State that has moved to promoting CSR standards based on a bottom-up collaboration. On the other hand, the USA, another regulatory State has tried an approach based on a top-down mandatory regulation in different areas of CSR before the Trump Administration. An example of a welfare State is the Netherlands, in which CSR's standards are facilitated by the government via different means, i.e. providing guidelines on CSR implementation, facilitating the adoption of ISO standards. More in general Western European welfare States have become more active in promoting CSR. For the developing State there is a high probability of market deficiencies that the private sector covers with CSR. An example is the Brazil with tight relations between the State (through the Brazilian National Development Bank) and companies; on one hand businesses are dependent on the State support and on the other the institutional weakness of the government makes companies more efficient providing public goods and social policies. Finally, an example of a predatory State is Nigeria and oil extraction during 1950s-80s. The Nigerian government failed to implement CSR due to the dependence of the State from oil extraction and the opportunistic relations between businesses and government officials.

<sup>132</sup> Samuel O Idowu and others *Corporate Social Responsibility in Europe, United in Sustainable Diversity* (Springer 2015) 155.



reporting, participating at the international level in international organisation for developing an international framework condition for CSR.<sup>133</sup>

#### 4.1 Is corporate social responsibility applicable to outer space environment?

The progresses made in the scientific and technologic sectors will facilitate access to remote areas of outer space and also, the exploration and exploitation of resources will lead to an increase of private investments.

There is, in fact, a need for sustainable corporate governance in outer space. As above mentioned, nor the *corpus iuris spatialis* nor the soft law instruments are specific enough to regulate outer space activities.<sup>134</sup> Hence the need is on the one hand, to develop new tools but on the other, to adapt existing legal instruments in order to achieve space sustainability and environmental protection. One possible tool that has to be considered is the CSR.

The CSR could and should be applied in outer space for two main reasons; the first one is the privatisation of the sector; the governmental parties, in fact, are now outnumbered by private ones. Also, the economic space sector is increasingly growing and a lot of States are starting to regulate, at the national level, their space sector to increase foreign investments and expand or create a well-developed space industry.<sup>135</sup>

The second reason, deeply linked with the first one, is that CSR can help companies to develop standards of responsible behaviours in areas where international law regimes have yet to be developed; as showed before, the *corpus iuris spatialis* and the UN Guidelines do not pay enough attention to the environmental protection and sustainable development.

Analysing the *corpus iuris spatialis* a major role in order to apply the CSR concept to outer space can be played by Article VI of the OST.<sup>136</sup> Art. VI imposes two important obligations upon States: an obligation to bear international responsibility for national activities in outer space, whether carried out by governmental or non-governmental entities, and an obligation for the appropriate State to authorise and continuously

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<sup>133</sup> *ibid* 158; For a more specify analysis on the different reason that led companies to implement CSR standards see Ian Christensen, 'Applying Corporate Social Responsibility Principles in the Space Sector' (Reinventing Space Conference, London, 2016).

<sup>134</sup> Thorbjørn Waal Lundsgaard, 'CSR in Space Corporate Social Responsibility Principles for the Space Industries' (2020) 1 Oil, Gas and Energy Law; Margarita Chrysaiki, 'The Sustainable Commercialisation of Space: The Case for a Voluntary Code of Conduct for the Space Industry' (2020) 52 Space Policy 8.

<sup>135</sup> Stefan Ellerbeck, 'The space economy is booming. What benefits can it bring to Earth?' (World Economic Forum, 19 October 2022) <<https://www.weforum.org/agenda/2022/10/space-economy-industry-benefits/>> accessed 27 March 2023.

<sup>136</sup> Elena Cirkovic, '#SpaceWatchGL Opinion: Corporate Social Responsibility in Outer Space', SpaceWatch.Global 2021 <<https://spacewatch.global/2021/03/spacewatchgl-opinion-corporate-social-responsibility-in-outer-space/>> accessed June 6 2023.

supervise private space activities.<sup>137</sup> Focusing on the first one all space activities can be considered national activities and so the CSR should be applied regarding companies' actions in space over and above their legal obligations.<sup>138</sup>

Since the CSR is soft law, the government's States should play a crucial role in raise awareness among both companies and stakeholder of the importance of CSR; from the society point of view, more the State can inform of the environmental challenges that business have to overcome, more likely there will be a growing attention on developing solutions to tackle the issues.

On the other hand, government provides, also, information to the companies about the vital role of applying CSR. The government should also create annual reports about the nation-wide application of the CSR, while also developing guidelines that address the main concerns and major problems of industries to ensure a broader applicability.

It is important to create a Code of Conduct,<sup>139</sup> periodically review to ensure its own effectiveness, to keep the focus on the matter and also, update the standards due to the technological development. A voluntary Code of Conduct for space could guarantee companies' responsible behaviour while offering a non-legislative governance ensuring sustainable development, including in space activities.<sup>140</sup>

The development of State issued guideline could create, in the long run a minimum legal standard at the international level, so that the international legal gaps could be filled.<sup>141</sup>

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<sup>137</sup> Luca Erhart, Maria Boutovitskai, 'Transforming Article VI of the Outer Space Treaty into an Effective Mechanism of Space Debris Mitigation' (Proc. 8th European Conference on Space Debris, Darmstadt, Germany, 20-23 April 2021, published by the ESA Space Debris Office). Article VI OST does not only lead to regulatory responsibility, it will also lead to liability for any damage caused by the wrongful conduct.

<sup>138</sup> Elena Cirkovic (n 136).

<sup>139</sup> Margarita Chryssaki (n 134), defines a Code of Conduct as "Principles, values, standards, or rules of behaviour that guide the decisions, procedures and systems of an organisation in a way that (a) contributes to the welfare of its key stakeholders and (b) respects the rights of all constituents affected by its operations". The Code of Conduct can become a tool for setting out the organisation's values, responsibilities, behaviours and obligations. Furthermore, they can become an asset for the company in developing sustainable decisions.

<sup>140</sup> *ibid.*

<sup>141</sup> An example of a draft of Code of Conduct is the EU one European Union, 'Draft International Code of Conduct for Outer Space Activities' (2014) <[https://www.eeas.europa.eu/sites/default/files/space\\_code\\_conduct\\_draft\\_vers\\_31-march-2014\\_en.pdf](https://www.eeas.europa.eu/sites/default/files/space_code_conduct_draft_vers_31-march-2014_en.pdf)> accessed 1 April 2023. This Code of conduct or the mitigation of space debris was never adopted. Is a soft law instrument, non-legally binding and its scope is to guarantee the sustainability of all outer space activities involving all launches both to the orbit and beyond. The Code recognises the freedom to explore outer space to all States in accordance to the international accepted practice, standards, *corpus iuris spatialis*- but not the Moon agreement- and the United Nations Charter. The Subscribing States have to refrain from activities that could create damages of space objects in order to minimise space debris. Two important principles described are the cooperation and mutual assistance ones that aim at notifying all States of activities related to possible collisions, manoeuvres, launches and malfunctioning of space objects. It established also the consultation mechanism. Also, annually the States are invited to share with the other subscribing States all their strategies that could affect the security and sustainability of outer space.



States could encourage transparency that through the regulation of monitoring and reporting makes companies often subject to accountability measures and helps widening social responsibility practice in the way the businesses are run. The transparency of quality standard and processes will have a peer pressure effect leading competitors to respect CSR standards and gain more social acceptance in the market sphere. Also embracing socially responsible policies can attract and retain customers that is essential for a long-term success of any company.<sup>142</sup>

## 5 Conclusion

As demonstrated in this paper, there is an urgent need to pave the way for the reduction of space debris, on-orbit collisions, and unsustainable space operations. The *corpus iuris spatialis* is not enough for these objectives, especially because it was created in a period where there were only two Space powers and in which the space environment was not the main concern.

Furthermore, today we live in a time where private actors outnumber the public ones; this situation led only to the development of soft law regulatory measures because private actors could be more willing to implement them as for example the 2019 Guidelines on the long-term sustainability and the Space Debris Mitigation Guidelines.

Regarding the development of space sustainability the adoption by States at the COPUOS level of international standards can be read a sign of the growing willingness to legally protect the outer space environment in the interest of all humankind.

To conclude, all countries, at the national level, must establish and implement relevant regulations in order to share information about space debris and other operations that could harm the space environment. Thorough the CSR States could ensure that business use and explore outer space without compromise its environment; also, thanks to the CSR guidelines businesses will have to be more transparent and accountable for their behaviour while also creating confidence building measures that ensures a more responsible activities.

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<sup>142</sup> Margarita Chrysoy (n 134), A positive corporate reputation has a significant impact on a company's ability to compete successfully, and the public opinion plays a major role in it. For example, in Europe protecting the environment appears to be one of the most important points of the society agenda calling companies for responsible behaviours. Since the public opinion is now highly concerned about Earth's pollution likewise it will have similar concerns about space pollution.